THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 11

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JAMES P. PAWLOSKI

Appeal No. 95-0489
Application 07/726,214[1]

ON BRIEF

Before THOMAS, KRASS, and BARRETT, Administrative Patent Judges.

BARRETT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 1-16, all the claims pending in the application.

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1 Application for patent filed July 5, 1991, entitled "Vectormeter."

The disclosed invention is directed to an apparatus for providing a graphic display of the operation of a generator in terms of real and reactive power, measured in watts and vars, respectively, in relation to the capability curve of the generator.

Claim 1, the sole independent claim, is reproduced below.

> 1. Apparatus for providing a real time visual graphic display indicative of the operating point, in terms of watt and var flow, of a generator in relation to the capability curve of the generator, comprising a visual display unit, a computer, memory storage media for storing program instructions and for transmitting such program instructions to said computer and for receiving and temporarily storing watt, var and capability curve data and for transmitting such data to said computer for use by said computer in calculating the positions of said operating point and the applicable capability curve in accordance with said program instructions, means for measuring watt and var flow of an operating generator and transmitting data representative of the measured watt and var flow to said memory storage media for storage, means for measuring data from which the applicable capability curve of said operating generator can be calculated and transmitting the same to said memory storage media, said computer being operative to read the watt, var and capability curve data from said memory storage media and process the same to calculate the positions of said operating point and applicable capability curve and produce data representative of such calculations in accordance with the program instructions from said memory storage media, and means for reading the data representative of such calculations from said computer and transmitting the same to said display unit to visually, graphically display on said display unit the operating point of the generator in terms of watt and var flow in relation to the capability curve of the generator.

The examiner relies upon the following references as evidence of obviousness:

Berry et al. (Berry)	4,029,951	June 14, 1977
Aotsu et al. (Aotsu)	4,245,182	January 13, 1981
Schaefer et al. (Schaefer)	4,675,147	June 23, 1987

Hope, G.S., and Malik, O.P., Microprocessor-based active and reactive power measurement, Electrical Power & Energy Systems (Great Britain), Vol. 3, No. 2, (April 1981), pages 75-83 (Hope).

Claims 1-16 stand rejected under 35 U.S.C. § 103 as being unpatentable over Hope, Berry, Aotsu, and Schaefer. The examiner's reasons are set forth in the Final Rejection entered June 16, 1993 (Paper No. 7).[2]

OPINION

We sustain the rejection of claims 1, 2, 4-12, and 14-16 and reverse the rejection of claims 3 and 13.

Claim groupings

Appellant sets out three groups of claims (Brief, page 5):

(I) claims 1, 2, 4, 5, and 8-10;

(II) claims 3 and 13; and

(III) claims 6, 7, 11, 12, and 14-16

Appellant argues claim 1 for group I (Brief, pages 5-16), claim 3 for group II (Brief, page 16) (we note that claim 13 corresponds in subject matter to claim 3 but depends on

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2 A previous Final Rejection (Paper No. 5) was withdrawn. In this decision, the "Final Rejection" refers to Paper No. 7.

claim 12), and has argued both claims 6 and 7 for group III (Brief, pages 16-17) (we note that claim 11 corresponds in subject matter to claim 6 but depends on claim 10, and that claim 12 corresponds in subject matter to claim 7 but depends on claim 11). Claims will stand or fall together with the claims argued (or which correspond to the claims argued) upon which they depend.

The examiner states that appellant has failed to provide reasons in support of the claims not standing or falling together and that the claims are presumed to stand or fall together (Examiner's Answer, page 2). This is incorrect. Appellant has argued claims 1, 3, 6, and 7 (Brief, pages 5-17). However, because the examiner has discussed claims 1, 3, 6, and 7 (Examiner's Answer, pages 4-5), the statement is considered harmless error and a remand is not required to consider the claims in groups II and III.

Factual findings

Scope and content of the prior art
Differences between the prior art and the claimed invention

No argument has been raised about nonanalogous art and, therefore, the references are found to be within the scope of the prior art.

Hope discloses a dual microprocessor-based system to provide active and reactive power signals for control applications (abstract, page 75). The system is shown in figure 3 (page 77). The first processor (MPU1) handles the control of the data acquisition system (DAS) and the computation of active power P (watts) and reactive power Q (vars) and the second processor (MPU2) provides analog and digital display of information (page 78, § III.3). The processors contain EPROM for storing program instructions and RAM for storing samples and results (page 79, § IV). The digital display module displays active power (watts) and reactive power (vars) in four-digit floating point numbers (page 78, § III.6); this is a numerical display of the operating point corresponding exactly to the digital readouts 36, 38 of appellant's figure 1. An optional analog output and output to other computer systems is shown in figure 3. The output to other computer systems may be like the experimental setup in figure 7 (page 79). Hope does not mention a capability curve and does not disclose graphically displaying the position of the operating point.

Berry discloses selection of an appropriate generator capability curve set based on existing hydrogen pressure (box 295, figure 9C; column 28, lines 6-9). A set of possible capability curves is shown in figure 11. The system computer calculates whether the generator operation point (as determined by megawatt (MW) and megavar (MVAR) readings) is within the appropriate generator capability curve (column 27, line 14, to column 29, line 21) and provides an alarm if the generator reactive capacity capability is exceeded (column 28, lines 17-21; box 301, figure 9C). Computer digital information is sent to displays 53, 54, and 55 (figure 2; column 10, lines 14-17), although no mention is made of displaying the operating point. Berry does not disclose graphically displaying the computed capability curve and measured operating point.

Aotsu discloses an excitation control apparatus used to control a field of a synchronous machine, such as an alternating current generator, under various conditions. The operating point of the generator is determined by the active power P and the reactive power Q. The conditions and controls are determined by the position of the operating point with respect to a generator capability curve as shown in figures 8, 10, 12, 13, and 15. Aotsu does not disclose graphically displaying the capability curve and the operating point.

Schaefer discloses generating a visual display of the real time safety status of a complex process plant. The discussion of prior art notes that humans have a highly developed capability to absorb information presented graphically rather than as a table of numbers (e.g., column 1, lines 60-67). The disclosed method of presenting data is on a polar coordinate graph, with a number of angularly spaced lines, one for each parameter, radiating from a common point. The length of each line represents the value of the parameter and the readings for all the parameters are connected to form a polygon. Upper and lower limits for each parameter are plotted on the display (figure 1). The process is in an unsafe condition when the polygon is outside the limits (e.g., figure 5). Schaefer does not disclose displaying a generator capability curve or control of a generator.

Level of ordinary skill in the art

The level of ordinary skill in the art has not been raised as an issue. The references are found to be representative of the level of skill in the art. In re Oelrich, 579 F.2d 86, 91, 198 USPQ 210, 214 (CCPA 1978) ("the PTO usually must evaluate . . . the level of ordinary skill [in the art] solely on the cold words of the literature"). In addition, the person of ordinary skill in the art is presumed to know something about the art apart from what the references expressly disclose. In re Jacoby, 309 F.2d 513, 516, 135 USPQ 317, 319 (CCPA 1962); In re Sovish, 769 F.2d 738, 743, 226 USPQ 771, 774 (Fed. Cir. 1985) (a rejection for obviousness involves consideration of the ordinary skill in the art, and it is wrong to presume stupidity rather than skill).

Obviousness

The examiner's obviousness conclusion has two parts. First, the examiner concludes that it would have been obvious to modify the input and processing portion of Hope to measure capability curve data in view of Berry and Aotsu to provide more control information about the generator device (Final Rejection, pages 3-4). Second, the examiner concludes that it would have been obvious to graphically display the operating point and generator capability curves of Hope, Berry, and Aotsu, in view of the teachings of the graphical display of a complex plant operation in Schaefer. We agree with these reasons and conclusions.

The test for obviousness is what the combined teachings of the references would have suggested to those of ordinary skill in the art. In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). There must be some suggestion to combine found either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art. In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598-99 (Fed. Cir. 1988). Hope, Berry, and Aotsu all deal with generator systems and all disclose measuring or computing watt and var flow as an indication of the operating point of a generator. Hope discloses the details of a computer system, having a memory and digital display, for the computation and digital display of watts and vars. Thus, there is an express suggestion in Hope to provide digital display of the operating point in watts and vars; there does not need to be a teaching to use a display in each reference.

Berry discloses measuring data to be used in selecting an applicable generator capability curve and calculating the position of the operating point relative to the curve. Aotsu is redundant to Berry in teaching that generator capability curves are well-known to those skilled in the art of designing generator control systems. Thus, Berry and Aotsu teach that one of ordinary skill in the art was aware that generator performance was determined by plotting the operating point (in watts and vars) against a capability curve. Hope does not disclose a capability curve; however, since Hope is intended to provide active and reactive power signals for control applications (abstract, page 75; outputs in dotted box labelled "Optional" in figure 3, page 77), it would have been obvious to incorporate capability curves as taught in Berry for more complete control information. Alternatively, it can be reasoned that it would have been obvious to substitute the structure for computing and displaying watts and vars values from Hope into a generator control system having capability curves, such as Berry, because one skilled in the art would have recognized that Hope is one specific structure for determining the watts and var values readings necessary to the system in Berry. The exact alignment of references (which reference is being modified) is not important. See In re Bush, 296 F.2d 491, 496, 131 USPQ 263, 267 (CCPA 1961). It is the collective teachings of the references that is important. We conclude that the Hope, Berry, and Aotsu would collectively have taught one of ordinary skill in the art: (1) the operating point of a generator, in terms of watt and var flow, can be measured or calculated; (2) the watt and var values of an operating point may be stored and retrieved from a computer and displayed digitally: and (3) the operating point must lie within a capability curve, which curve is selected depending on measured data, such as hydrogen pressure.

None of the references expressly teach graphically displaying the operating point and generator capability curves; nevertheless, we conclude that this limitation would have been obvious over Schaefer. Schaefer teaches that graphical presentation of data is more understandable to humans and shows the graphical display of data from a complex control environment. This suggests that the operating point data of generator control systems be displayed graphically for better understanding. Schaefer uses a polar coordinate display in which the safe status of the system is a polygon with all vertices lying between upper and lower limit marks on the spokes. One skilled in the generator art seeking to provide a graphical display of generator status would have known that the locus of acceptable generator operating points was the capability curve, that is, that a graphical representation of generator status already exists. Therefore, one skilled in the generator art seeking to provide a graphical display would have found it obvious to display the operating point on the compatibility curves (as shown in figure 11 of Berry and figure 8 of Aotsu), that is, to simply translate the graphical information from paper or equations to a graphical display.

Claim 1 is directed to the concept of graphically displaying the operating point on a capability curve using a computer. For the reasons discussed above, we believe the one of ordinary skill in the art would have been motivated to provide such a graphical display to enhance human understanding of the data. It would have been within the level of skill in the art to implement the graphical display, as evidenced by the fact that appellant provides no detailed description of how it should be accomplished. See In re Fox, 471 F.2d 1405, 1407, 176 USPQ 340, 341 (CCPA 1973) (appellant's specification "assumes anyone desiring to carry out the process would know of the equipment and techniques to be used, none being specifically described").

We have carefully considered appellant's arguments and have tried to address them in formulating the analysis above. However, we add the following specific comments. As to appellant's discussion of the deficiencies of the individual references (Brief, pages 7-10), one cannot show nonobviousness by attacking the references individually where, as here, the rejection is based on a combination of references. In re Keller, 642 F.2d 413, 426, 208 USPQ 871, 882 (CCPA 1981).

Appellant argues that "[t]here is nothing in Hope et al. to indicate a need or desire for capability curve data" (Brief, page 11) and "Berry et al, which relates to a power plant that is automatically controlled without operator intervention, uses the capability curve information only for transmission to correction circuitry within the system, and it is not apparent that that would be appropriate in Hope et al." (Brief, page 11). One skilled in the art knew about capability curves and operating points, as evidenced by Berry and Aotsu. Admittedly it would have been ideal to have a discussion of a capability curve in Hope to provide a express teaching linking all three references, but the rejection is based on obviousness over what the references collectively teach. Our assessment of Hope, Berry, and Aotsu is that one skilled in the art would have known about capability curves and operating points and would have considered it obvious to incorporate capability curve data into Hope or apply the computer structure of Hope to Berry's existing control system having capability curves. A person of ordinary skill in the art is presumed to know more that what is expressly taught in a reference. Jacoby.

Appellant argues that "the 'display' in Schaefer, et al has nothing to do with the capability curve of a generator, or its operating point" (Brief, page 14). Schaefer is applied for its teaching to use a graphical display to make complex information more readily understood by humans. Schaefer's polar display is a general method for graphical display of parameters. One skilled in the art would have known that where a known graphical relationship for a machine exists, such as the capability curve and operating point for generator operation, that it would have been preferable to display that graphical relationship. Thus, we consider appellant's argument nonpersuasive.

For the reasons presented above, the rejection of claims 1, 2, 4, 5, and 8-10 is sustained.

Group II -- claims 3 and 13

With respect to claims 3 and 13, the examiner finds that Berry shows a block 43 labelled "Manual Supervisory Control," and that "[a]ll of the input to the computer though the interrupt system is used in the software process to calculate the capability curve in step 295" (Final Rejection, page 6).

The examiner concludes that "it would have been obvious to include an indication of manual operation as provided in Berry et al. to the system of Hope et al. for providing a better indication of the generator operating conditions" (Final Rejection, page 6). However, claims 3 and 13 require more than just indication of manual operation; they require modifying a portion of the capability curve (line 66 in appellant's figure 1) and transmitting it to the visual graphic display. We find no suggestion of modifying a portion of the capability curves in Berry or Aotsu in response to manual operation of the generator. Thus, the rejection of claims 3 and 13 is reversed.

Group III -- claims 6, 7, 11, 12, and 14-16

The examiner concludes that it would have been obvious to provide scales at right angles on a graphical display as recited in claim 6 because "Berry et al. shows a plot of watts on one axis and vars on the other and representing the operating point on this plot (Figure 11) as one of the calculations derived by the system" (Final Rejection, page 7). The same reasoning applies to claim 11. We agree that it would have been obvious to provide scale information on a graphical operating point display because axes are shown in Berry and because it is notoriously well known that axes of graphs are labelled with scales to provide useful information. Appellant does not argue why, assuming that the graphical display of claim 1 would have been obvious, it would have been nonobvious to provide scale information for the reasons given by the examiner. Appellant makes no argument about the position of the scales being along the margin of the display. Accordingly, we sustain the rejection of claims 6 and 11.

With regard to the straight line extensions recited in claims 7 and 12, we agree with the examiner's conclusion that such extensions would have been obvious to facilitate a more accurate reading of the position of the operating point (Final Rejection, page 8). Appellant argues that the examiner's conclusion is not supported by a reference (Brief, page 18). However, not all conclusions need to be supported by an express teaching in a reference. Jacoby; In re Bozek, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969) (it is proper to rely on a conclusion of obviousness "from common knowledge and common sense of the person of ordinary skill in the art without any specific hint or suggestion in a particular reference"). It was well-known to use graticules[3] and cursors[4] on optical and

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[3] A "graticule" is defined as "a scale on glass or other transparent material in the focal plane of a telescope or other optical instrument for the location and measurement of objects." Webster's Third New International Dictionary (unabridged) (G.&C. Merriam Co. 1961).

[4] A "cursor" is defined as "a part of a mathematical instrument that moves back and forth upon another part." Webster's. Thus, the cursor on a slide rule was used to line up scales for calculation purposes.

graphical displays for measurement purposes. This supports our opinion that one of ordinary skill in the art would have been motivated to add straight line extensions to a measurement point to make it easier for a human operator to read the position of the operating point against the scale axes. Thus, we sustain the rejection of claims 7, 12, and 14-16.

CONCLUSION

The rejection of claims 1, 2, 4-12, and 14-16 is sustained.

The rejection of claims 3 and 13 is reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

JAMES D. THOMAS Administrative Patent Judge	
ERROL A. KRASS Administrative Patent Judge	BOARD OF PATENT APPEALS AND INTERFERENCES
LEE E. BARRETT Administrative Patent Judge	

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